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Atty. Docket No.: P69661US0

REMARKS

The Office Action mailed December 23, 2005, has been carefully reviewed and by this Response, Applicants have canceled claims 23-26 and 30, amended claims 19-21 and 29, and added claims 31-34. Claims 1, 4-22, 27-29 and 31-34 are pending in the application; claims 1, 19, 20 and 33 are independent. Claims 1 and 4-18 are withdrawn while expressly reserving the right to file a divisional application directed thereto.

As an initial matter, Applicants have amended the specification to include text relating to the hemispherical shape of the welding as now set forth in claims 19, 20 and 33. This text does not represent new matter as the shape is clearly shown in Figures 1 and 2 as originally filed. The text is being added merely to provide textual correspondence in the specification with the claim language.

The Examiner rejected claims 19-21, 28 and 29 under 35 U.S.C. 103(a) as being unpatentable over U.S. Publication No. 2004/0089640 to Bager et al. ("Bager") in view of U.S. Publication No. 2004/0080573 to Buchanan et al. ("Buchanan"), and rejected claim 22 as being unpatentable over Bager and Buchanan and further in view of U.S. Publication No. 2003/0003296 to Dries et al. ("Dries").

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As set forth in amended claim 19 as well as new claim 33, the present invention is directed to a radiation welded product having a first part and a second part welded together with a welding. The first part has a high transmission at a predetermined wavelength and the second part has an absorption coefficient, μ_a , and a scattering coefficient, μ_s , at the predetermined wavelength, with $\mu_s > (1/10) * \mu_a$. The welding formed by radiation has a generally hemispherical profile with a penetration depth that extends into the second part as shown in Figures 1 and 2. This hemispherical profile is possible because of the thickness of the second part which allows the scattering benefit therein to be more fully realized.

As set forth in amended claim 20, the present invention is further directed to a radiation welded product having a first part and a second part welded together with a welding, in which the first part has a high transmission at a predetermined wavelength, the second part has an absorption coefficient, μ_a , and a scattering coefficient, μ_s , at the predetermined wavelength, and $\mu_s > 0.4 \text{ mm}^{-1}$ and $\mu_a < 4 \text{ mm}^{-1}$. As in claims 19 and 33, the welding has a penetration depth extending into the second part with a generally hemispherical profile enabled by the thickness of the second part

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which affords better scattering benefit. This is not shown by the prior art.

Bager is directed to a method for welding components of a multi-layer construction in which the middle layer of a three-layer assembly includes an absorbent component. Laser light is passed through each of the outer layers, resulting in local heating and welding of such layers to the middle layer (see paragraphs [0037] and [0038]). However, Bager does not contain any disclosure or teaching of a further material having a specific scattering coefficient.

Buchanan teaches a system for laser welding upper and lower work pieces along a weld interface. In discussing the transmission rate of the laser through a work piece, Buchanan cites the Beer-Lambert Law which recognizes that the total extinction coefficient of a work piece is comprised of the light scattering coefficient of the work piece plus the light absorption coefficient of such piece. However, this mere recognition of the contribution of the light absorption coefficient to the total extinction coefficient does not suggest the different depths of light penetration obtained when one of the parts being welded includes not only an absorbent material but also a light scattering material as claimed by the present invention. More specifically, Buchanan

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does not teach or suggest a radiation welded product with a welding, formed between a first part having a high transmission at a predetermined wavelength and a second part having an absorption coefficient, μ_a , and a scattering coefficient, μ_s , at the predetermined wavelength, with $\mu_s > (1/10) * \mu_a$, having a generally hemispherical profile with a penetration depth extending into the second part as set forth in claims 19 and 33. Nor does Buchanan teach or suggest a radiation welded product with a welding, formed between a first part having a high transmission at a predetermined wavelength, and a second part having an absorption coefficient, μ_a , and a scattering coefficient, μ_s , at the predetermined wavelength, with $\mu_s > 0.4 \text{ mm}^{-1}$ and $\mu_a < 4 \text{ mm}^{-1}$, such welding also having a generally hemispherical profile with a penetration depth extending into the second part, as provided in claim 20.

For at least the foregoing reasons, claims 19, 20 and 33 are patentable over Bager and Buchanan.

To the extent that Dries may be pertinent to the broad subject matter of the claimed invention, it is noted that Dries does discuss the use of scattering in a material in relation to laser welding. This discussion relates, however, to laser welding where the radiation is *transmitted through the scattering and absorbing film* in order to melt such film for adherence thereof to

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a lower layer. To ensure the complete melting which is necessary to obtain the intended adherence, the film layer has to be very thin. This limits the usefulness of the Dries technology.

The present invention, by contrast, has a thicker absorbent layer, with the hemispherical profile of the welding indicating that the radiation has been transmitted to the welding through the first part, i.e., through a high-transmission element. There is, therefore, no limit to how thick the absorbing element, i.e., the second part, can be as the radiation does not have to pass through the second part, but rather through the first part. This is not shown or suggested by Dries such that the combination of Bager, Buchanan and Dries is insufficient to teach the present invention as claimed. Accordingly, favorable consideration and allowance of claims 19, 20 and 33 is requested.

Claims 21, 22, 27-29, 31, 32 and 34 are also in condition for allowance as claims properly dependent on a rejected base claim. Favorable consideration and allowance thereof is requested.

With this amendment and the foregoing remarks, it is respectfully submitted that the present application is in condition for allowance.

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Should the Examiner have any questions or comments, the Examiner is cordially invited to telephone the undersigned attorney so that the present application can receive an early Notice of Allowance.

Respectfully submitted,

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